NCSP
NUCLEAR CRITICALITY SAFETY PROGRAM

CALIBAN/PROSPERO Experiments September 2014 Results *Nuclear Accident Dosimetry*

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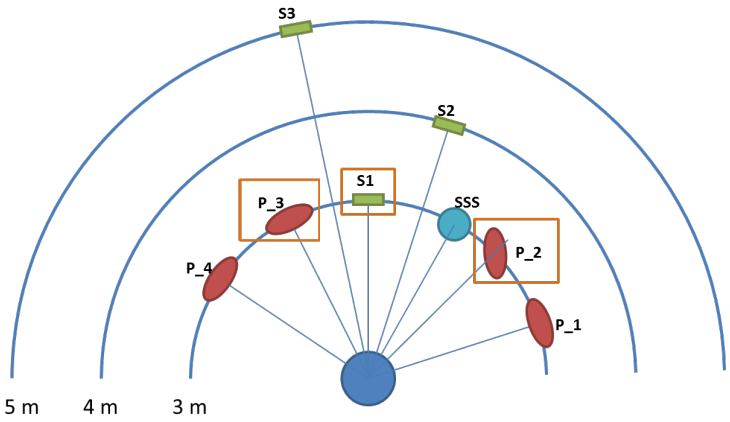
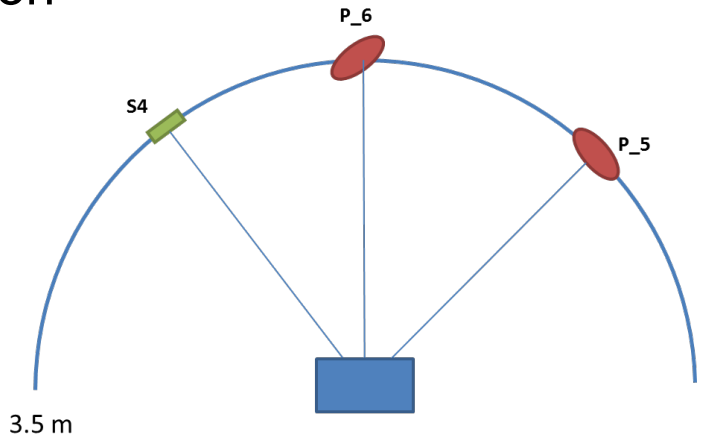
Introduction

- Objectives of the Experiments
  - Test PNADs and exercise the process
  - Train new personnel on nuclear accident dosimetry
  - Compare results with IRSN and AWE
  - Build relationship with IRSN colleagues

- Two irradiations over two days
  - 41 dosimeters
  - 4 configurations for each irradiation



CALIBAN
Tuesday 2nd September 2014



PROSPERO
Wednesday 3rd September 2014

Exercise Results- Neutron

Reactor	Irradiation	Distance (m)	Location	Orientation	LLNL Average Measured Dose (Gy)	Ratio to 0° Phantom Results
CALIBAN	Pulse	3	Phantom	0°	1.23	1
			Stand	0°	1.56	1.27
			Phantom Front	45°	1.13	0.92
			Phantom Rear	45°	0.64	0.52
PROSPERO	Steady State (1500s)	3.5	Phantom	0°	0.28	1
			Stand	0°	0.29	1.04
			Phantom Front	45°	0.19	0.68
			Phantom Rear	45°	0.17	0.61

Exercise Results- Gamma

Reactor	Irradiation	Distance (m)	Location	Orientation	LLNL Average Panasonic Measured Dose (rem)	LLNL PIC Measured Exposure (R)	Ratio to PIC Results
CALIBAN	Pulse	3	Phantom	0°	69	58	1.19
			Stand	0°	47	56	0.84
			Phantom Front	45°	68	-	-
			Phantom Rear	45°	53	-	-
PROSPERO	Steady State (1500s)	3.5	Phantom	0°	10	11	0.91
			Stand	0°	6	10	0.60
			Phantom Front	45°	11	-	-
			Phantom Rear	45°	6	-	-

Challenges

- Measurements
  - Gamma Spec equipment non-functional for ~12 hours
    - Adjusted count time
    - Adjusted counting geometry
    - Used colleague's equipment
- Calculations
  - Correction for Steady State Irradiation
  - Correction for 45° Orientation

Presentation of Results

- **IRSN Presentations**
  - **2014 AWE/IRSN/LLNL Intercomparison of Criticality Accident Dosimetry with CALIBAN and PROSPERO Reactors**

    iM 2015 International Conference on Individual Monitoring of Ionising Radiation, April 2015
  - **2014 CALIBAN and PROSPERO Experiments for the Criticality Accident Dosimetry Intercomparison**

    ICNC 2015 International Conference on Nuclear Criticality, September 2015

- **LLNL Report**
  - **LLNL Results from the CALIBAN/PROSPERO 2014 Nuclear Accident Dosimetry Exercise, pending review**